

## Appendix 1 – Machinery requirements for cranberry production

This appendix provides a list of the equipment and machinery for cranberry farming which were encountered during this research. These requirements relate to cranberry bed establishment, and fertiliser, herbicide and insecticide application, harvesting (raking and extraction from flooded beds), water management and the maintenance of ditches/dykes and renovation of the beds which involves peat extraction. In the main images have been sourced online or from visits to the Habelman Brothers or Lake Nakomis cranberry farms.

Item of Equipment	Description
<b>Water management</b>	
	Solar powered water monitoring station, Habelman Brothers, Wisconsin.
	Weather stations are critical to precision management of cranberry crops (Wisconsin Research Station).



Sluice gates used to flood and drain the cranberry bogs/marshes to and from natural wetlands (Habelman Brothers, Wisconsin).



Water pump powered by mains electric (Habelman Brothers, Wisconsin).



The wooden system in image on the left shows the method used at Habelman Brothers to increase the water table height. The mechanism at Lake Nakomis (see image on the right) is similar. A number of wooden slats are used to block the outlets to the cranberry bed until the required height or complete flooding is achieved.







Irrigation system  
Sub-surface pipes are attached to sprinklers in 3 transects placed longitudinally across the cranberry beds (Habelman Brothers, Wisconsin).

### Harvesting



Historic machinery used for combing/raking cranberry plants and loosen cranberries, Lake Nakomis, Wisconsin. This could be used in the UK as part of a less intensive LIC farming system.



Tracked vehicle for raking cranberry plants, Lake Nakomis, Wisconsin.



Vehicle used for cutting cranberries etc. in the polders in the Netherlands (cf. The Cranberry Company).



Cranberry harvesting using toothed hand harvesters on Terschelling Island, Netherlands.



Mowing of cranberry plants for pruning/provision of brush for cranberry bog restoration (Wisconsin Cranberry Growers Trade Fair).

See Ivanovs (2011) for more information regarding the automated harvesting of cranberries in Latvia.



An array of machinery was located at Lake Nakomis, Wisconsin, where peat extraction was being carried out. It was unclear here whether the drive for peat extraction was for horticultural purposes or to establish new cranberry beds.



Pipework at Lake Nakomis, Wisconsin.





Tractor with extended arm for mowing of cranberries either for pruning (Wisconsin Cranberry Growers Trade Fair).



Cranberry Growers Association Trade Fair.

Tracked vehicle for maintenance and restoration of cranberry beds and ditches/ponds/wetlands.



This vehicle was observed at Lake Nakomis cranberry farm, Wisconsin used for peat extraction and ditch maintenance.

### Weed control



Source: [www.carbonrobotics](http://www.carbonrobotics), 2024

#### Laser weeder

Resistance to herbicides and the need for more sustainable management, weed killers are being replaced by other innovative practices. A pilot study in Seattle with tech start up Carbon Robotics which makes the autonomous Laser Weeder uses a combination of laser technology, GPS and artificial intelligence to kill 100,000 weeds per hour. It is thought that because the weeder uses thermal energy it does not disrupt the soil (apart from compaction due to trafficking). However, it does use about 22 gallons of diesel in 20 hours (see Campbell, 2021).



#### Digital weeder

Source NFU ([www.fwi.co.uk](http://www.fwi.co.uk), 2018)



#### Laser weeder

Source NFU ([www.fwi.co.uk](http://www.fwi.co.uk), 2019)

### Fertiliser application



On farm innovation at Habelman Brothers, Wisconsin has led to this design of machinery for applying fertiliser, insecticide and herbicide accurately to specific cranberry beds. The spraying machinery spans the whole bed and the tractors move in parallel up and down the beds.



Habelman Brothers, Wisconsin.

### Transport



Historic transport used for cranberries, Lake Nakomis, Wisconsin. Large modern cranberry farms have on farm storage or refrigerated storage to transport harvested cranberries and ensure freshness.